RESEARCH ESSAY

# INTELLECTUAL CAPITAL: AN EMERGING CONCEPT APPLICABLE TO THE CANADIAN FORCES?

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## INTRODUCTION

> *No one buys a share of Apple Computer or IBM stock because of the firm's material assets. What counts are not the company's buildings or machines, but…the ideas crackling inside the heads of its employees…*
>
> *Alvin Toffler*[1]

Intellectual capital has always been a decisive factor in the rise of civilizations, organizations, and people. For at least 60,000 years our ancestors, the Cro-Magnon's, lived side by side with the Neanderthals. Then, about 30,000 years ago, the Neanderthals disappeared. Why did one species survive and the other perish? Both used tools and language, but the Cro-Magnon's had a lunar calendar. Soon they correlated the passing days with the migratory patterns of bison, elk, and deer. This insight was dutifully recorded on cave-wall paintings and in sets of 28 notches on reindeer antlers. Hungry for meat, the Cro-Magnon was taught that all he had to do was wait at a river crossing on certain days, spear in hand. In the meantime, the Neanderthals appear to have unwisely scattered their men and their scarce resources in search of random encounters. They allocated their resources poorly and perished. Intellectual capital made the difference![2] For the purposes of this paper, it is defined as the possession of the knowledge, applied experience, organizational technology, customer relationships, and professional skills that provide an organization with a competitive edge.[3]

Intellectual capital is an important topic that rarely had been studied or understood until the early 1990s.[4] However, since Fortune magazine published a cover story in June 1991, there has been an explosion of interest. More recently, interest in intellectual capital research has reached an astounding level, signaling what appears to be the beginning of a paradigm shift in the way organizations are understood and managed.

This is accompanied by extraordinary growth in managerial publications, academic studies, dedicated conferences, corporate initiatives and internet sites.[5] Big organizations like Dow Chemical, Hughes Aircraft, and the Canadian Imperial Bank of Commerce are now acting because they realize that value and competitive edge are created by the knowledge their people have and how they apply that knowledge in their work. Small organizations that depend on the talents of their employees are also taking notice, as often their only competitive advantage is their people.[6]

Intellectual capital is now being identified as a key intangible resource in organizations. Consequently, ensuring that strategic leaders and managers understand this, and that organizational structures and cultures reflect this is fast becoming a matter of organizational survival.[7] Clearly, organizations that do not know the value of their own intellectual capital may not know if they have the people, resources, or processes in place to achieve future organizational goals and objectives. Further, they may not realize what know-how, management potential or creativity their employees possess. Because they are devoid of such information, they reorganize, downsize and re-engineer in a vacuum.[8]

Despite the feverish interest and exponential growth in this field within the civilian environment, scarcely a word has been said about intellectual capital within either the Department of National Defence or the Canadian Forces. This is surprising given that a professional and effective military force, as stated by former Minister of National Defence - Douglas Young, is entirely dependent upon the calibre of its

individual members. Thus, in an era where equipment is increasingly sophisticated, operations are more complex, and change is a reality of life, it is imperative that the Canadian Forces invest in and support its members. An atmosphere of continuous education, training and professional development is an important element of this investment.[9] Given this statement, and the potential for significant human resource development implications, it would seem prudent to review the concept of intellectual capital.

In light of the above, the thesis of this paper is to argue that intellectual capital is more than just a buzzword, but is applicable to the Canadian Forces. This will be accomplished by first examining the nature of intellectual capital. Then, the human resource challenges of the future will be outlined. Following this, intellectual capital implications for the Canadian Forces will be described, particularly those which impact on human resource development.

## INTELLECTUAL CAPITAL EXAMINED

To appreciate the nature of intellectual capital, one must first understand human and structural capital as these, combined, form intellectual capital. Following a discussion of these two elements, intellectual capital will be outlined.

**Human Capital.** This is the combined knowledge, skill, innovation, and ability of organizations, individual employees, managers, or leaders to meet the tasks at hand. It

also includes the organization's values, culture, and philosophy. Human capital is not owned by the organization.[10] Though the essence of human capital is the sheer intelligence of each organizational member,[11] it must also capture the dynamics of an intelligent organization in a changing competitive environment. For example: Are employees and managers constantly upgrading their skills and adding new ones? Are these new skills and competencies recognized and utilized by the organization? Are these new skills, as well as the experiences of company veterans, being shared throughout the organization? Or alternatively, is the organization still drawing on a body of aging and increasingly obsolete skills, ignoring new competencies gained by employees, and locking up knowledge as a way of cornering power and influence within the organization?[12]

Most of what organizations do is through, with, and for people. High-performing companies, with long-term successful track records, really value their people. Organization leaders serve their people by developing, empowering, and challenging them. A true commitment to people means going beyond the popular cliché "people are our most important asset."[13] One of intellectual capital's gurus, Leif Edvinsson, believes that "…only the human factor interpenetrates the others, serving as an active agent operating upon all the others. Without a successful *human dimension* to a company, none of the rest of the value creation activities will work, no matter how sophisticated the technology. An unhappy company is a worthless company; an enterprise without values has no value."[14] Thus, from this we can gather that without a successful human

dimension, building intellectual capital won't work and the chances of the organization being successful are reduced.

Employees do not have the potential to contribute equally to an organization. Knowledge workers (those higher level professionals or personnel with technical skills) have been referred to by Nick Bontis and John Girardi as "Expert Employees". These individuals tend to provide most of the intellectual horsepower of an organization and are typically the ones that provide much of the higher added-value service to it. The human capital represented by these employees is important because it is a source of innovation and strategic renewal. Thus, from a human capital perspective, we can deduce that knowledge workers are a most valuable resource; managers must be aware of the importance of providing their knowledge employees with challenging work in order to retain knowledge in organizations; organizations will need to have very clear strategies for retaining their knowledge workers; and knowledge workers are the primary contributors to success in organizations.[15] This is not to say that only knowledge workers contribute to an organization.

**Structural Capital.** This is the organizational capability that supports the employee's productivity (in a word, everything left at the office when the employees go home). It includes the information technology systems (hardware and software), databases, organizational structure and concepts, patents, trademarks, copyrights and documentation. A defining characteristic of structural capital is that it grows out of

human capital. It is people who transform human capital into structural capital to add to an organization's strength.[16]

Structural capital also includes customer capital, which is the relationship developed with key customers. In the words of Hubert Saint-Onge, former vice president of learning organization and leadership development at the Canadian Imperial Bank of Commerce, and a leading theory developer of intellectual capital, "Human capital is what builds structural capital, but the better your structural capital, the better your human capital is likely to be."[17] Unlike human capital, which cannot be owned, structural capital can be both owned and traded away.[18]

Thus, structural capital involves the organization's routines and structures that support employees' quests for optimum intellectual performance and, therefore, overall organizational performance. If the organization has poor systems and procedures or is not able to track employee actions, or measure intellectual capital, the overall intellectual capital will likely not reach its fullest potential.[19]

**Intellectual Capital.** As stated earlier, this is the possession of the knowledge, applied experience, organizational technology, customer relationships and professional skills that provide an organization with a competitive edge. A simplified definition is: Human Capital + Structural Capital = Intellectual Capital.[20] Intellectual capital accounts for the gap between the values of enterprises in traditional accounting and investors assessment of those values. For example, the book value of Netscape, a small software

company of only 50 employees, was $17 million. An initial stock offering soon valued the company at $3 billion.[21] The difference between the firm's market value and the cost of replacing its' assets was intellectual capital. It is those things that we normally cannot put a price tag on, such as expertise, knowledge, and an organizations learning ability.[22]

Intellectual capital is an important topic that has rarely been understood or taken into consideration. Charles Handy, the author of "The Age of Unreason", stated that intellectual inputs and outputs are generally ignored by managers, even though they often would far outweigh the assets on balance sheets. Clearly, intellectual assets, instead of being ignored, should be seen as an organization's most valuable assets. Further, he warns that no executive would leave factory space or cash idle, yet if asked how much of their company's knowledge was used, they typically would say, "only about 20%".[23] If this is the case, it would seem probable that full advantage is not being taken to generate value from the remaining 80% of the knowledge available in the company. Why then are intellectual inputs and outputs ignored on balance sheets, and is full advantage not taken of knowledge? Generally, it was always assumed that this difference was entirely a subjective factor and if it could not be measured, then it wasn't considered to be of value.[24] Clearly, traditional accounting mechanisms fail to calculate the most important resource of an organization: its intellectual capacity![25] Instead, current mechanisms treat people as liabilities or expenses instead of assets.

creates and applies is more important than the knowledge one simply accumulates.[26] Thus, when intelligent people combine with a greater awareness of available knowledge and the rapid sharing of that knowledge, it creates a wave of innovations in an organization that allows it to ride into the future.[27]

Despite this, today's senior managers face the difficulty of measuring and managing an organization's chief ingredient: the intangible assets of skill and knowledge. Unfortunately, traditional measurement tools are not applicable.[28] To that end, a methodology and valuation system is required which will enable managers to identify, document, and value their knowledge in pursuit of becoming "learning organizations."[29] This will enable them to make well-informed decisions including whether to invest in the protection of their various intellectual properties.[30] Senior leaders or managers will continue to struggle to develop intellectual capital until the basic mechanisms of measuring it are mastered by the organization.[31]

Organizations that are interested in developing intellectual capital need to follow a methodology. These include: make knowledge management a requirement for evaluation purposes (i.e. assign personal targets to intellectual capital development by having personnel learn something that the organization does not know); formally define the role of knowledge in the business and find and secure the greatest sources of intellectual capital; assess competitors strategies and knowledge assets; determine the extent of intellectual capital resources available from other government departments, industry, and non-governmental organizations/associations; produce a knowledge map of

the organization which will help determine where both people and knowledge systems reside; evaluate the relative worth of the intellectual capital (use monetary values or organizational developed indices); identify gaps to be filled or holes to be plugged based on weaknesses relative to other competitors, customers or suppliers; and finally, both assemble knowledge portfolios in an intellectual capital addendum to an annual report and continuously assess the development of intellectual capital.[32]

Once a measurement system for intellectual capital has been established and is understood, it should ideally be shared not only within the organization, but also with strategic partners and customers. Such a system should be used for innovation and the fostering of renewal and development.[33]

Because intellectual capital looks at human and structural factors as value creators, not just financial factors, it can be applied effectively to for-profit enterprises (such as businesses) and non-profit organizations (such as the military and governments).[34] The business world, in particular, is now recognizing the importance of the intellectual capital concept and adapting it to their operations in order to give them a competitive edge. Indeed, one in five Fortune 500 companies now employs a chief knowledge officer,[35] and innovative organizations like Skandia, the largest insurance and financial services company in Scandinavia, have even gotten to the stage where they are releasing intellectual capital annual reports as a supplement to their financial report. Numerous other well known firms have seized the concept, including Dow Chemical, the Canadian Imperial Bank of Commerce, Hughes Aircraft, Posco (the South Korean steel

giant), Ernst & Young Accounting, and Hewlett-Packard.[36] [37] Academia and other interested parties are also now seriously involved in researching all aspects of intellectual capital. This has led to the publication of books and studies, the conduct of large symposiums such as the 3rd World Congress on the Management of Intellectual Capital held in Hamilton, Ontario from 20-22 January 1999, and numerous web pages related to intellectual capital.[38]

From this brief discussion it would appear that intellectual capital (including both human and structural capital) is a key resource in organizations. Regretfully, this resource, in the past, has largely been seen as intangible. This resulted in traditional accounting systems allocating little or no value to it. As a result, most organizations have no idea whether or not they will remain competitive and succeed in the future. Based on an explosion of interest in intellectual capital in the 1990s, many organizations (particularly in business) now have a significant appreciation of its value. They are now ensuring that their managers understand this, and that their organizational structures and cultures reflect it as a means of survival. Based on the serious attention that intellectual capital is receiving from business and academia alike, and their application of it, it is reasonable to deduce that intellectual capital is more than just a buzzword.

## HUMAN RESOURCE CHALLENGES OF THE FUTURE

An understanding of the human resource challenges that are likely to influence the Canadian Forces as it moves into the 21st Century will help put into perspective the relevance of intellectual capital.

**Strategic Context.** Canadian Forces personnel will operate in a very different environment in the 21st Century than has been the case since 1945. Professional, intellectual, technical, and ethical demands placed on military personnel by the policies, strategic paradigms, doctrine and force structure of the Cold War have all changed. Now, for the first time in 35 years, the Canadian public expresses genuine interest in defence issues. Members of the Forces henceforth will need to be acutely sensitive to the society they represent, able to give sophisticated explanations for the necessary defence effort and professionally capable of outstanding performance while conducting operations. The highest professional and personal qualities, together with exemplary leadership skills, are required both to lead highly trained elements of the Canadian Forces and to satisfy public demands for world class service to country.[39]

Internationally, the forces of globalization and fragmentation have created a security environment of unprecedented complexity and uncertainty. Professor James Roseneau of Princeton University has observed that:

> "Global life may have entered a period of turbulence the like of which it has not experienced since major shifts in all dimensions of world politics culminated in the Treaty of Westphalia in 1648".[40]

Although the danger of global war is considered to have diminished, most analysts predict that the future will see the increased use of violence or the threat of violence by nations and non-nations to achieve objectives. This reflects a loosening of power block constraints on ethnic violence, increased competition for resources, a widening gap between "haves" and "have-nots", growing nationalism and fundamentalism, and, with the decline of superpower influence, the rise of regional powers. Further, the decline of the nation state and growing power of non-state actors including drug cartels, mafias, religious factions, and terrorist groups will change the nature of both warfare and diplomacy. When it occurs, the collapse of democratic institutions produces massive problems ranging from refugees and the spread of disease through environmental and ecological disasters, to financial turmoil. International security will be defined in a wider context than simply defence and greater cooperation will be necessary between militaries, other government departments, international organizations and non-governmental organizations. This will mainly be the result of the merging of traditional boundaries between the armed forces and government departments, and new threats.[41]

Operations taking place in this new strategic setting create enormous challenges in the education and training of future members of the Canadian Forces.[42] In addition to the obvious requirement for exceptional technical competence, Canadian Forces members will have to serve as soldier-diplomats and possess strong analytical, conceptual and communication skills, and be capable of both adapting to complex situations and thinking rationally in times of crisis.[43]

**Work Force.** In terms of demographics, the well-documented Canadian age profile will see a significant growth in those over 65 and only moderate increases in the youth bracket. A sustained population and no increases in work force growth would require that immigration double in the near future, which is unlikely. This, combined with the increased migration of professionals and skilled labour to foreign markets, will generate hyper-competition within Canada for high tech and knowledge workers.[44] It will be challenging for the Canadian Forces to attract quality personnel and to retain them.

**Revolution in Military Affairs.** The post-industrial transition from the machine age to the information age is transforming the nature of war and leading to what many knowledgeable observers are calling a revolution in military affairs. The world of information based warfare is a world where logic bombs, computer viruses, Trojan horses, precision guided munitions, stealth designs, radio-electronic combat systems, new techniques for intelligence gathering and deception, micro-wave weapons, space-based weapons and robotic warfare are being designed, developed and deployed.[45] Further, information dominance will play a key role in the revolution in military affairs as decision cycles are reduced. The complexity of problems brought on by the revolution in military affairs will require highly intelligent, flexible and agile leaders who are imbued with experience and knowledge to rapidly adapt tactical, operational, and strategic plans.[46]

**Knowledge Accumulation.** In the words of Dorothy Leonard-Barton of the Harvard Business School: "…knowledge accumulates slowly, over time…and are not static pools but wellsprings, constantly replenished with streams of new ideas and constituting an ever-flowing source of corporate renewal."[47] The challenge of leadership will be not only to obtain and to develop highly intelligent and capable personnel, but also to ensure that those members, as they become more knowledgeable and experienced, choose to stay with the organization for a lengthy period. Failure to do so may result in the substantial loss of knowledge and relationships, which require significant time to replace.

From this brief discussion of future human resource challenges it is apparent that the Canadian Forces will be required to operate within an environment of complex problems, draw from a shrinking pool of knowledge workers, develop and, more importantly, retain highly intelligent and experienced workers.

## IMPLICATIONS FOR THE CANADIAN FORCES

Given the increasingly important role that intellectual capital is playing in many non-military organizations, it is reasonable to question whether there is a potential for application to the Canadian Forces and, if so, what are the implications (particularly for human resource development). This section will review the future human resource challenges to confirm that there is the need for application by the Canadian Forces. Then, education and knowledge will be discussed, as they are typical of the many areas

which have intellectual capital applicability. Finally, intellectual capital measurement will be examined in a Canadian Forces context.

**Human Resource Challenges.** Based on the review of Canadian Forces future human resource challenges just outlined, it is clear that many problems will be related in one way or another to intellectual capital. The complex strategic environment will require well-educated, well-trained personnel capable of rational thought while adapting to changing situations. Similarly, the revolution in military affairs will require personnel at all rank and employment levels who are not only intelligent and flexible but technically competent and adaptable in order to handle the changing nature of information based war. Knowledge accumulation, the rapid passage of knowledge, and retention of experience will be particularly important in the future strategic environment as a means to successfully resolve issues and maintain a competitive advantage. This will be challenging in the future, particularly given a diminishing work force. Attracting and retaining knowledge workers must become a priority for the Canadian Forces. Based on this, and the fact that intellectual capital offers a new way of coping with future strategic challenges (given its leveraging of human capital and structural capital in combination), it would seem apparent that there is a need for application by the Canadian Forces.

**Education.** An area with intellectual capital applicability is education. Within the United States military the emphasis on education is reflected by the comments of Professor Richard Kohn who, when speaking at an American conference on "Military Education for the 21st Century Warrior," stated "the United States officer corps must

assure the finest human capital…our officers will need to be broadly and deeply educated, as well as tough and competent – people of judgment, wisdom, balance, and depth…".[48] The professor went on to propose numerous recommendations relating to the education of United States officers, some of which were quite controversial. What is important here is not only that the importance of education within the United States military was being emphasized, but also that forums of this type are regularly held by the United States military to ensure such subjects are debated openly and with intellectual vigor. This challenges not only leaders but all members of the military. In particular, it is indicative of the type of culture which intellectual capital can promote. This should not be a surprise given that the United States general officer corps is considered "a collegial intelligentsia".[49]

This contrasts quite sharply with the Canadian Forces who, in the 1990s, have been criticized for an officer corps that is poorly educated and, some would say, had slipped into anti-intellectualism.[50] Some would further say that this was the root of the troubles which confronted the Canadian Forces in the first half of the 1990s. The logic behind this train of thought was that although badly needed, thinking was something that was in short supply. When dealing with complex situations requiring judgement and intelligence, those who are well educated, have experience and common sense are more likely to succeed. Within the Canadian military, by 1997, only half the officer corps had undergraduate degrees and only 6.79 percent held advanced degrees. This contrasts with the United States where 90 percent of officers had undergraduate degrees and 37 percent had graduate degrees, with the latter effectively a prerequisite for promotion to major.[51] [52]

In response to this criticism, the Minister of National Defence directed 13 specific changes impacting on training, education, and professional development. Foremost amongst these was the requirement that all regular force officers have a university degree as a prerequisite to commissioning as an officer. The only exceptions, theoretically, are to be made for those commissioned from the ranks.[53] Further, there is a new emphasis on post-graduate education as indicated in the Officers' Professional Development Handbook, which now states that officers with post-graduate degrees are to receive credit for their achievements.[54] Though these are all positive measures, the longer term Canadian Forces commitment to the changes and their effect on human resource development will likely be hit and miss unless intellectual capital is adopted in a meaningful way which truly places a value within the organization on education, knowledge, the sharing of knowledge within it, and a means to measure it is found.

**Knowledge.** The Canadian Forces is a complex organization in which knowledge plays an extremely important role in almost all areas and at all rank levels. Indeed, understanding of the past can help navigate into the future as it forms not only a body of existing knowledge, but also a constant seeking for new information and resultant ideas. The result of the pursuit of knowledge by members of the Canadian Forces can be an organization that is poised, confident, literate, and is well matched to the complexities and challenges of modern warfare.[55]

Despite the importance of knowledge, a great deal of work remains to enhance the Canadian Forces understanding and utilization of this area. This will be necessary in order to engage people in such a way that they will freely and enthusiastically donate their intellectual capital,[56] to share knowledge so as to imbue others, to generate new ideas, and to retain those who have attained it. If not able to retain them, then somehow their knowledge must be captured. By studying, then adopting and utilizing intellectual capital wisely, the Canadian Forces could better manage, develop and utilize knowledge so as to meet the challenges of the future.

Leveraging what members of the Canadian Forces know is a critical success factor for the future. However, as knowledge grows, proliferates, and specializes, making use of these members' present knowledge is not enough. To create wealth with it, the members themselves must be kept up-to-date. Without a continual replenishment of the well of knowledge, it will eventually run dry. Employees must be constantly learning in order to meet not only today's challenges, but also those of tomorrow. This will have an impact on human resource development so as to ensure learning programs are in place. To address the needs of employees there will be a need to facilitate formal training and development programs, to encourage informal learning, and to reward learning.[57]

Although only two areas have been discussed above, one's imagination can run rampant with possible implications of the application of the intellectual capital concept. For instance, what is the impact on personal evaluation reports? Perhaps, these should

be adjusted to incorporate key elements such as the encouragement of education, learning, and the sharing of information. What is the impact of an increased focus on the value of knowledge? Given the costs, time commitment, and importance to the Canadian Forces, perhaps more career and technical courses at all rank levels should be subject to obligatory service (e.g. the Canadian Forces Command and Staff College Course). What is the impact on intellectual property? Perhaps based on an intellectual capital measurement system, the relevancy of various organizations would become more transparent as the value of successes, such as DCIEM's blood substitute technology, would be more readily apparent.[58] This is particularly important given that recent regulation changes now allow monies for patents (intellectual property) to be passed to the institution which developed the technology. These monies can in turn be used to off-set operating costs. What is the impact on human resource management? Perhaps Knowledge Officers or Intellectual Capital Officers will be required as part of organizational structures at strategic, operational, and even tactical levels. Beyond these rudimentary possibilities, it is likely that every part of the Canadian Forces would be impacted by this concept. This could include the Canadian Forces culture, values, recruiting, training, information systems, reward system, and both the human resource management and development systems.

**Intellectual Capital Measurement.** A Lieutenant Commander maritime engineer took his release from the Canadian Forces in 1998. This officer held a Masters of Science degree and had completed the year-long Canadian Forces Command and Staff College course in 1997 and a one year French language course in 1998. His release was

taken at the age of 42, and just three months after completion of the language course.[59] The individual was clearly considered to have potential and utility to the Canadian Forces for another 13 years and this had resulted in a substantial investment in his professional development. This individual symbolizes Canadian Forces human capital. When combined with the organization's structural capital, he would have been able to contribute significantly to ensuring a successful Canadian Forces as it tackled future challenges. Instead, this resource was lost!

This example is likely one of many at all rank levels which occurs annually within the Canadian Forces. Important questions should be asked: What will be their loss mean for the organization? Given that the loss of these individuals will result in a depletion of knowledge – is this being captured by the organization? Can their losses be easily replaced? Has the impact of their departure been minimized by having "banked" their knowledge? Are the losses of knowledge and experience known by key leaders within the Canadian Forces? Are these departures indicative of an inappropriate culture or reward system? The answers to these sorts of questions could become more apparent with a measurement system of intellectual capital.[60]

Currently, within the Canadian Forces, intellectual capital remains an intangible resource and there is no measurement system to capture it. This is apparent when reviewing Defence Planning Guidance 1999.[61] Without a methodology and valuation system to identify, document, and value their knowledge, the Canadian Forces will

continue to be deficient in information when making decisions related to personnel. The likelihood of the organization then struggling to develop intellectual capital is high.

A possible solution to this would be to develop an intellectual capital supplement to the current Defence Planning Guidance measurement system. Clearly, this would be no easy matter and would require careful and detailed consideration. Perhaps one way of doing the development work would be to provide this as an opportunity to several forthcoming military graduate students. This would take advantage of in-house human capital and facilitate the determination of both a suitable measurement system and provide for a more detailed analysis of implementation considerations of intellectual capital within the Canadian Forces.

In summary, this section of the paper has shown that intellectual capital has the potential for wide application to the Canadian Forces. It would have considerable implications in a variety of areas; however, this would only be the case if an effective measurement system was developed and put in place.

## CONCLUSION

This paper has argued that intellectual capital is more than just a buzzword, but is applicable to the Canadian Forces.

Though organizations in the past viewed intellectual capital (including both human and structural capital) as largely intangible, this changed in the 1990s. There has been an explosion of interest in this decade and many organizations (particularly in business) now have a significant appreciation of its value. Based on the serious consideration that intellectual capital is receiving from business and academia alike, and the fact that many organizations are now applying its principles, it is clear that intellectual capital is more than just a buzzword.

A review of future human resource challenges shows that most problems to be faced by the Canadian Forces will be related in one way or another to intellectual capital. Based on this, and the fact that it offers a way to successfully cope with these challenges (given its leveraging of human capital and structural capital in combination), it would seem apparent that there is a need for application by the Canadian Forces.

Though the development of human capital would be a key component to future success, the Canadian Forces has been subject to criticism particularly with regard to the level of education of its officers. Whilst policy changes are now being implemented to improve this situation, it is felt that an intellectual capital measurement system is required. It could be included as part of the Defence Planning Guidance performance measurement framework. Encouraging military graduate students to do research on both intellectual capital implementation implications and development of a measurement system for the Canadian Forces could be a practical way to pursue this matter.

Further, the importance of knowledge to help navigate into the future and achieve success will be very important for the Canadian Forces. To be competitive and successful in what they do, the Canadian Forces must become a knowledge organization. In turn, leveraging what members know will be a critical success factor. The implications of intellectual capital on the Canadian Forces are extensive. Once again, many of these will not be understood or known unless a measurement system for it is developed.

In conclusion, this paper has determined that intellectual capital has applicability for the Canadian Forces.

## NOTES

[1] Alvin Toffler, Powershift (New York: Bantam Books, 1990) 61.

[2] Leif Edvinsson and Michael S. Malone, Intellectual Capital (New York: HarperCollins Publishers Inc., 1997) ix and x.

[3] Ibid 43.

[4] Nick Bontis, "There's A Price On Your Head: Managing Intellectual Capital Strategically," Business Quarterly, Summer, 1996: 43.

[5] Nick Bontis and John Girardi, "Teaching Knowledge Management and Intellectual Capital Lessons: An Empirical Examination of the Tango Simulation," Paper for submission to 3rd World Congress on Intellectual Capital 20-22 January 1999, 3. The Fortune Magazine article was entitled – Brainpower: How Intellectual Capital is Becoming America's Most Valuable Asset. It was written by Thomas Stewart and published on 3 June 1991.

[6] Frances Horibe, Managing Knowledge Workers (Toronto: John Wiley and Sons Ltd., 1999) xiii.

[7] Bontis and Girardi "Teaching Knowledge Management…" 2.

[8] Ibid 2 and 8.

[9] Douglas M. Young, "Compendium of Changes in the Canadian Forces and the Department of National Defence" in Report to the Prime Minister. (Ottawa: DND Canada, March 25, 1997) 10.

[10] Ibid 11.

[11] Bontis and Girardi "Teaching Knowledge Management…" 7.

[12] Edvinsson and Malone, "Intellectual Capital…" 34.

[13] Timothy C. Hoerr. "Strategic Planning: The Seven Foundations of High Performing Organizations," Agency Sales, Vol. 29 Issue 1, 1999: 1 of 2.

[14] Horibe, "Managing Knowledge Workers…" xiv.

[15] Bontis and Girardi, "Teaching Knowledge Management…" 7 and Appendix A.

[16] Edvinsson and Malone, "Intellectual Capital…" 11, 35, and 46.

[17] Ibid 11, 35, and 36.

[18] Ibid 46.

[19] Bontis, "There's A Price…" 43 and 44.

[20] Edvinsson and Malone, "Intellectual Capital…" 44 and 45.

[21] Ibid 2.

[22] Bontis, "There's A Price…" 43.

[23] Ibid 43.

[24] Edvinsson and Malone, "Intellectual Capital…" 12.

[25] Debra M. Amidon, Innovation Strategy for the Knowledge Economy – The Ken Awakening (Boston: Butterworth-Heinemann, 1997) 11.

[26] Ibid 19.

[27] Bjorn Wolrath, "Power of Innovation," Intellectual Capital, Supplement to Skandia's 1996 Interim Report: 9.

[28] Bontis, "There's A Price…" 43.

[29]Peter M. Senge in his book "The Fifth Discipline" describes the meaning of a learning organization as one that is continually expanding its capacity to create its future. For such an organization it is not enough merely to survive. Learning enhances one's

ability to create. The Fifth Discipline was published in 1990 by Currency-Doubleday.

[30] Bontis and Girardi, "Teaching Knowledge Management…" 8.

[31] Bontis, "There's A Price…" 46.

[32] Ibid 46.

[33] Edvinsson and Malone, "Intellectual Capital…" 61.

[34] Ibid 21.

[35] Horibe, "Managing Knowledge Workers…" xiii. The actual term "Chief Knowledge Officer often varies from organization to organization. Dow Chemical for example uses the term "Director of Intellectual Assets" (see Edvinsson and Malone, "Intellectual Capital…" 18).

[36] Edvinsson and Malone, "Intellectual Capital…" 16 and 18.

[37] Bontis, "There's A Price…" 47.

[38] An example of information related to intellectual capital that is available "on line" include: 3rd World Congress on the Management of Intellectual Capital, The Official Intellectual Capital Home Page, Intellectual Capital Group, Trend Monitor International, Ivey Business School Organizational Learning Home Page, The Learning Organization, The MINT Research Centre, Knowledge Management Consortium, IBM Think Leadership, and Knowledge Inc.

[39] Ramsey Withers Study Group, "Review of the Undergraduate Program at Royal Military College," Report to the Royal Military College Board of Governors, 4 of 27. Linked from http://www.rmc.ca/boardgov/reports/withers/doc_e.html. Internet

accessed 7 April 1999.

[40] Ibid 4 of 27.

[41]Department of National Defence, "Into the 21st Century: Strategic Human Resource Issues," (Ottawa: Directorate of Strategic Human Resource Analysis Submission to Defence Management Committee, NDHQ, Canada, December 1998) 6.

[42] Withers, "Review of the…" 6 of 27.

[43] Department of National Defence, "Into the 21st…" 6.

[44] Ibid 2,4 and 5.

[45] Withers, "Review of the…" 6 of 27.

[46] Department of National Defence, "Into the 21st…" 7.

[47] Edvinsson and Malone, "Intellectual Capital…" 66.

[48] Richard H. Kohn, "Remarks by Professor Kohn," Naval Postgraduate School and Office of Naval Research Conference on Military Education for the 21st Century Warrior, Monterey, California, 15-16 January 1998. Available from http://web.nps.navy.mil/FutureWarrior/Remarks/Kohn.html. Internet accessed 23 April 1999.

[49] J.L. Granatstein, "For Efficient and Effective Forces" in Report to the Prime Minister – A Paper Prepared for the Minister of National Defence (Ottawa: DND Canada, March 25, 1997) 19.

[50] Amongst those who are critical of the level of education of the Canadian Forces officer corps are Dr. J.L. Granatstein and Dr. Albert Legault. Both have written on this subject within reports which were submitted to the Minister of National Defence. These

reports were subsequently published as Reports to the Prime Minister of Canada dated March 25,1997 respectively.

[51] Granastein, "For Efficient and …" 19 and 20.

[52] J.L. Granastein, “On Military Education,” The Conference of Defence Associations Magazine - On Track, Vol. 3, #3, Nov 3/98: 1 and 2.

[53] Young, “Leadership and Management…” 15-18.

[54] Department of National Defence, A-PD-007-000/JS-H01 The Officers’ Professional Development Handbook (Ottawa: DND Canada, 17 March 1997) 12.

[55] J.L. Granastein, “On Military Education…” 2.

[56] Horibe, “Managing Knowledge Workers…” 57.

[57] Ibid 109 and 110.

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